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**UNITED STATES DEPARTMENT OF COMMERCE  
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
|-----------------|-------------|----------------------|---------------------|

09/625,893    07/26/00    ALLEN    D    TH1258 (US)

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PM82/0829

| EXAMINER |
|----------|
|----------|

MITCHELL, K

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

3672

DATE MAILED: 08/29/01 <sup>3</sup>

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

**Office Action Summary**

Application No.

09/625,893

Applicant(s)

ALLEN ET AL.

Examiner

Katherine W Mitchell

Art Unit

3672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☒ Claim(s) 5,6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

## **DETAILED FIRST ACTION**

### ***Abstract***

1. The abstract of the disclosure is objected to because applicant used the implied phrases "is disclosed" in line 1 and "is also disclosed" in line 3 of the abstract.

Correction is required. See MPEP § 608.01(b).

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 250 words. It is important that the abstract not exceed 250 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

### ***Specification***

3. The disclosure is objected to because of the following informalities:

FIG. 5 is never discussed under "Detailed Description of Illustrative Embodiments" on page 4.

On page 5, line 8, the sentence beginning "Whereas the stacking..." is grammatically awkward. Examiner suggests omitting the word --Whereas--.

On page 6, the following spelling or grammar errors need to be corrected:

Line 6, "attached" should be --attach--

Line 11, "form" should be --from--

Line 12, "constructed" should be --constructed--.

On page 7, the following spelling or grammar errors need to be corrected:

Line 8, "that and surface" should be --that surface--

Line 9, "effect" should be --affect--

Line 10, "experienced" should be --experience--

Line 15, "the an" should be --the-- **or** --an--

On page 8, line 4, "and most" should be --and is most--.

On page 8, the meaning and purpose of the sentence on lines 5-6 is unclear to examiner.

Nowhere in the specification is the term "RMS", as used on page 8 line 10 and Figure 15, ever defined.

Appropriate correction is required.

### ***Drawings***

4. The drawings are objected to because:

Figure 8 shows half sleeves "10A" and "10B" as part of the drilling riser. Figure 13 appears to correctly depict "10A" and "10B".

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 14 does not label "cable 42", as described on page 5, line 12.

Correction is required.

### ***Claim Objections***

5. Claims 5 and 6 are objected to because of the following informalities: Claims 5 and 6 state "K/D roughness parameter". Claims 2 and 3 state "K/D ratio". Either terminology is acceptable, but the terminology should be consistent. Correction is required.

### ***Claim Rejections – 35 U.S.C. 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "ultra-smooth" in claims 1 and 4 is a relative term which renders the claim indefinite. The term "ultra-smooth" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Note that in the specification, applicant refers to a K/D of  $1 \times 10^{-4}$  resulting in "substantial VIV reduction" on page 8, line 4, and in the same line refers to a K/D of  $1 \times 10^{-5}$  as "most

pronounced" VIV reduction, and on page 8, line 15 refers to a K/D of  $5.1 \times 10^{-4}$  as ultra-smooth and very-pronounced. On page 5, line 23 – page 6 line 7, applicant states that the "ultra-smooth" surface could be provided by "sleeves made of copper, carbon fiber, rubber, or any sufficiently smooth thermoplastic, metal alloy, or other material".

Applicant continues that the "smooth surface" can even be obtained by paint or other coating.

Claims 2 - 3 are rejected as depending from claim 1.

Claims 5 - 6 are rejected as depending from claim 4.

8. Claims 2, 3, 5, and 6 recite the limitations "the average peak to trough distance" and "the effective outside diameter" in the last 3 lines of the claims. There is insufficient antecedent basis for these limitations in the claims.

### ***Claim Rejections – 35 U.S.C. 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 3, 4, and 6 are rejected under 35 U.S.C. 102 (b) as being clearly anticipated by Ortloff et al., US Patent 4398487. Ortloff et al. disclose in column 5 lines 29-37 a substantially cylindrical fairing made of thermoplastic or aluminum or nickel alloys, or plastic reinforced with fibreglass. Although "ultra-smooth" is never explicitly

Art Unit: 3672

stated by Ortloff et al., applicant states in page 5 line 23-page 6 line 4 that the "ultra-smooth surface could be provided by sleeves made of copper, carbon fiber, rubber, or any sufficiently smooth thermoplastic, metal alloy, or other material. Applicant on page 8 line 15 states that an example of ultra-smooth was  $5.1 \times 10^{-5}$  K/D. Thus if thermoplastic is ultra-smooth, and ultra-smooth has a K/D of  $5.1 \times 10^{-5}$ , the thermoplastic fairing of Ortloff et al. must have a K/D of  $5.1 \times 10^{-5}$  or smaller.

11. Claims 1-6 are rejected under 35 U.S.C. 102 (b) as being clearly anticipated by Gregory, US Patent 4470722. Gregory teaches in column 4 lines 59-65 a cylindrical housing element for use with a marine production facility that has an exterior coating of fiberglass or plastic. Although "ultra-smooth" is never explicitly stated by Ortloff et al. or the '584 patent, applicant states in page 5 line 23-page 6 line 4 that the "ultra-smooth surface could be provided by sleeves made of copper, carbon fiber, rubber, or any sufficiently smooth thermoplastic, metal alloy, or other material. Applicant on page 8 line 15 states that an example of ultra-smooth was  $5.1 \times 10^{-5}$  K/D. Thus if plastic is ultra-smooth, and ultra-smooth has a K/D of  $5.1 \times 10^{-5}$ , the plastic cylindrical housing of Gregory must have a K/D of  $5.1 \times 10^{-5}$  or smaller.

### ***Claim Rejections – 35 U.S.C. 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



Art Unit: 3672

13. Claims 1-6 are rejected under 35 U.S.C. 103(a) as obvious over Blevins et al. in view of Mech 441: Losses In Piping, revised by Rick Sellens 96.09.09, hereafter called Mech 441, or CE/ME 101 abc handout#5, Incompressible Flow over a Circular Cylinder, hereafter called CE/ME 101, or Drag of Blunt Bodies and Streamlined Bodies, or Transition Prediction in Flow over Roughness Elements, or the email dated August 20, 2001 from Princeton University Chair of Mechanical and Aerospace Engineering Professor A.J. Smits discussing the widespread knowledge since around 1900 of the effect of smooth surfaces on reducing turbulent flow.

Blevins et al teaches in column 2 lines 20-22 and column 5 line 64-column 5 line 6 and Figure 14 a substantially cylindrical sleeve and a method for controlling vortex induced vibration based on relative position. However, Blevins et al. are silent on the material of construction, and do not teach the specific feature that the surface, or the surface coating, should be ultra-smooth or with a K/D ratio of  $1 \times 10^{-4}$  or less. Examiner takes official notice, backed up by Mech 441 or CE/ME 101 or Drag of Blunt Bodies and Streamlined Bodies, or Transition Prediction in Flow over Roughness Elements, that smooth surfaces are known (by all of ordinary skill in the field of fluid dynamics or physics) to create less turbulent flow than rough surfaces. Mech 441 refers, on page 2, lines 4-5, to the relative roughness,  $\xi/D$ , which is defined exactly as applicant defines his K/D factor; that is, as the ratio of height of the typical or average roughness element to the pipe diameter. Mech 441 relates the friction factor, and thus the drag coefficient, to the Reynolds Number and relative roughness on page 3, the top diagram. This diagram shows that at a given Reynolds number, the friction factor increases as the

relative roughness increases. While this is for flow inside a pipe, CE/ME 101, or Drag of Blunt Bodies and Streamlined Bodies, or Transition Prediction in Flow over Roughness Elements all teach that relative roughness increases turbulent flow and drag over cylinders. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Blevins et al. in view of Mech 441: Losses In Piping, revised by Rick Sellens 96.09.09, or CE/ME 101 abc handout#5, Incompressible Flow over a Circular Cylinder, or Drag of Blunt Bodies and Streamlined Bodies, or Transition Prediction in Flow over Roughness Elements or the email dated August 20, 2001 from Princeton University Department Chair Professor A.J. Smits to include sleeves or fairings with smooth surfaces or smooth surface coatings in order to minimize drag and friction over the surface to reflect known laws of fluid dynamics.

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 6-48136 to Denison et al. teaches a VIV protection for deepwater risers.

US Patent 4073983 to Van Cleave teaches adding a coating to a surface to decrease resistance to flow.

US Patent 6148751 to Brown et al. teaches a vibration and drag reducing system for fluid-submerged hulls.

US Patent 3581449 to Huber teaches an apparatus for reducing vortex induced motion on a mast.

Graham, Flow Past a Cylinder, 4 pages, downloaded from  
<http://astron.berkeley.edu/~jrg/ay202/lectures/node18.html>

Mikolaitis, University of Florida, Friction Factor Calculator, 1 page, downloaded  
from <http://grumpy.aero.ufl.edu/gasdynamics/colebrook10.html>

Vortex Shedding behind a circular cylinder, 4 pages, downloaded from  
<http://www.sintef.no/nhl/vass/cylinder.html>

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine W Mitchell whose telephone number is 703-305-6713. The examiner can normally be reached on Tuesday - Friday and alternate Mondays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 703-308-2151. The fax phone numbers for the organization where this application or proceeding is assigned are 703-306-5687 for regular communications and 703-308-8623 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-1113.

KWM  
Aug 21, 2001

  
DAVID BAGNELL  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3600